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ORIGINAL ARTICLES.

OCULAR TUBERCULOSIS IN RELATION TO THE NOSE AND THROAT.

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Theoretically the bacillus tuberculosis may enter the human anatomy in a variety of ways, but practically the respiratory tract is first considered whenever the diagnosis of tuberculosis is thought of in any individual.

Of the respiratory tract, the lungs and bronchi are usually named as the chief primary seat of the disease, though local lesions may exist in the larynx, throat, or nose. The lesions in the nose and throat are not, as a rule, considered of great importance except in their relation to tubercular inflammation in the bronchi and lung tissue itself. It is the tubercular disease within the chest that is generally supposed to lead to complicating lesions in other parts of the body.

Though individual cases may be judged differently, this states the general opinion.

It is not a simple matter to prove that a tubercular process in a given organ is really a primary process. In tubercular diseases of the eye, we rarely suppose it to be other than a secondary process. Our principal concern in those apparently healthy individuals who nevertheless show unmistakable signs of ocular tuberculosis is to find the location of the primary lesion so that our treatment may be directed to the real cause and not merely to the ocular symptom.

In this search for the cause of the tuberculosis in the eye, we have in certain cases met with conditions in the upper air

passages, throat, nose, and accessory sinuses, which might easily explain the ætiology of the ocular process without involvement of the lower respiratory tract. In fact, the absence of any sign of pulmonary tuberculosis makes it seem conclusive, in some of these cases, that the ocular condition was the direct result of conditions in the nose. Upon a moment's reflection, it is not difficult to trace the course of a tubercular infection from the nose to the eye. The close anatomical relations, the numerous anastomoses between the bloodvessels of the nose and orbit, and what would seem to be of even greater importance, the connections between the lymphatic circulation of the eye and the nose.

We know that tubercle bacilli may be taken up from the throat and carried to the chain of lymphatic glands on the side of the neck. Then what is to hinder tubercle bacilli from being carried forward in the perivascular lymphatics of the ophthalmic artery from any point of its relation with the sphenoidal or postethmoidal sinus as it passes through the bony canal along with the optic nerve, to any point of the ocular tissues supplied by its branches including the retina itself? We know that often the bony wall of this canal is very thin or entirely deficient, so that the mucous lining of the sinus may be in direct contact with the optic nerve and the ophthalmic artery. The possibility of a tubercular inflammation of this mucous membrane cannot be denied. Therefore its transference to ocular tissues becomes quite a simple matter.

In fact, this mode of carrying the tubercular infection to the eye appears so rational that it seems likely that in cases in which pulmonary tuberculosis is known to exist and later tubercular lesions appear in the eye, the ocular condition may yet be brought on in this way. The infection is carried to the accessory nasal sinuses in coughing, etc., and thence to the eye. It seems more likely that it comes about in this way than to suppose that it is carried to the eye through the general circulation. If tubercle bacilli are carried into the general circulation in such amount that some of them are likely to strike the eye, we may expect their development in many other tissues of the body, producing a general miliary tuberculosis and a fatal result. Many cases of ocular tuberculosis show none of these serious general symptoms, so that we may assume that the infection has reached the eye in some such manner as above described, rather than through the general circulation as a direct metastasis from the diseased lung tissues. It seems strange that this method of transmitting the

tubercular infection to the ocular tissues is not more generally recognized and emphasized. To confirm this theory, experiments were attempted in the laboratory of the Washington University Medical School by inoculating the nasal passages of rabbits with tubercle bacilli. Our experiments have thus far not been sufficiently extensive to permit conclusions.

However, in our own experience the following cases were among those that made the above theory of causation seem not only probable but almost certain. We may, therefore, be permitted to present briefly a few clinical reports.

CASE 1.—Retino-choroiditis O.D. and O.S.

F. W. F., age 31, white, male, married, occupation farming and teaching country school in northern part of Missouri.

Consulted me first, May 19, 1908, with following history:

Sixteen years ago vision of O.S. began to fail. Some time later, on his way to college in Iowa, he was examined by an oculist in Burlington, Iowa, who said there had probably been a hæmorrhage in the center of sight in the retina and that nothing could be done. The defect in vision O.S. remains unchanged.

About 3 months ago vision in O.D., his good eye, began to fail. He has not been able to read for 2 months. Five weeks ago he consulted an oculist in Keokuk, Iowa, who pronounced the condition in the right eye a central retinitis, but stated that the scar in the macula of the left eye was due to an old choroiditis. He was put on K I in increasing doses but without benefit.

Present condition, O.D. vision 16/48, O.S. vision 16/150 excentric, not improved by glasses.

Ophthalmoscope shows, O.D. (recently involved), two central choroidal spots, each about 1-5 size of the disc, one just below the macula, which seemed older, showing irregular pigmentation and scar tissue—the other about one disc diameter removed to the temporal side and above, showing fresh infiltration. Also several small pigmented scars (?) in the inferior segment of the choroid near the æquator.

O.S. old choroidal scar at the macula of irregular sharply defined pigmented outline—probably twice the size of the optic disc.

The family history gave no evidence of lues or tuberculosis. On questioning, the patient states that the recent attack in the right eye came on immediately after a heavy cold, and he thought the same was true of the attack in O.S. sixteen years ago.

A nasal examination, made at once by Dr. Greenfield Sluder,

revealed "nothing definite". The patient was temporarily given small doses of $HgCl_2$ but without noticeable benefit.

A general examination by Dr. L. M. Warfield revealed a "suspicious" condition in the apex of the right lung. He was sent to the hospital for a tuberculin test. After preliminary temperature tests for 2 days, 0.0005 m.g. tuberculine O.T. was injected. On the following day, Dr. Sluder, who had made daily observation, reported finding *for the first time* a discharge from the right sphenoidal sinus. Two days later 0.003 m.g. O.T. was injected by Dr. Warfield. On the following day, ophthalmoscopic examination showed increased swelling and œdema about the central choroidal lesions. Tests showed a slight diminution of the visual acuity O.D. Later, Dr. Sluder telephoned that now the diagnosis of inflammation in the postethmoidal and sphenoidal sinuses on the right side was absolutely positive. Though this profound and striking reaction was present in the nose together with a local reaction in the ocular fundus, neither one of us considered at the time the significance of this result. For the hospital records and physical examination by Dr. Warfield show there had not been the *least sign* of a general reaction. Dr. Warfield also noted the absence of any local cutaneous reaction at the point of injection in the arm. We decided that the patient had been shown to be free from tuberculosis and that in some obscure way the ocular condition might be dependent on the nasal disturbance. The nasal treatment was continued and so were the small doses of $HgCl_2$. In ten days the nasal reaction had subsided. Dr. Sluder decided the patient's condition was good enough to warrant his return home to the northern part of the state.

During these ten days there had been a steady improvement in visual acuity. The results of the visual tests at this time were not surpassed either before or since, O.D. vision 16/24, O.S. vision 16/96. Had the true import of the unusual reaction in this patient's nose been realized at this time, the final cure might have been accomplished and perhaps even a better visual result obtained in the better eye.

Upon his return in a month, a possible slight extension of the choroidal process toward the disc in the recently affected eye was made out. Attempts to measure the progress of the encroachment of this process within the central 10° of the visual field with the Haitz stereoscopic cards—usually so well adapted for this purpose—were uncertain in this case because there was no central fixation in the other eye.

After nasal examination at this date, Dr. Sluder reported that he could not find anything wrong. The nasal reaction after the injection of tuberculin had been followed by improvement such as is often observed in other tissues to follow its use, only we had not connected the cause and effect. Two weeks later (6 weeks after the last injection of tuberculin), the ophthalmoscopic examination showed the choroidal inflammation in the right eye undergoing cicatrization in a satisfactory manner without any extension. With the Maddox rods placed over O.D. no break in the light streak was noticed at 16 feet; over O.S. there was a large central break in the streak. Central vision remained at 16/24 O.D. equaling the best result.

September 17, 1908.—Six weeks later, no active lesion was to be noted in the fundus O.D. and Dr. Sluder reported the nose to be in normal condition. Upon his return home he even resumed teaching school. Two months later, he reported trouble in reading but he disregarded the advice to return at once. When he returned to St. Louis the next March (6 months later), his vision in the better eye (O.D.) was much worse, being only 16/75 and excentric. He had been compelled to give up teaching altogether.

Ophthalmoscopic examination showed new choroidal infiltration in the macular region O.D. He stated he had been again suffering from a "cold". A general examination made by Dr. Walter Baumgarten (Dr. Warfield having removed from St. Louis), revealed "no suspicion" of tuberculosis. Dr. Sluder reported some nasal disturbance and continued local treatment for 2 weeks with some improvement of vision. The patient was now taken off $HgCl_2$ and placed on Ung. Hg. (ʒ ss. daily) and K I internally. Upon return in 1 month, examination showed further increase in choroidal infiltration. Central vision was practically destroyed in O.D.; excentrically vision was about 16/60. The Maddox rods over O.D. now showed an interruption greatest (about 6 inches) in the horizontal meridian toward the temporal side.

These developments fully convinced me of the uselessness of antisyphilitic treatment. The condition of the eye was becoming rapidly worse while specific treatment was being crowded most. The nasal examination revealed nothing abnormal at this date.

Dr. Baumgarten consented to make a von Pirquet test, though the examination nine months before had been clearly negative.

At this time, however, the von Pirquet test was positive. Dr. Baumgarten concurred in the recommendation to follow out a course of treatment with tuberculin, though there was no evidence of a tubercular lesion in the lungs or other organs. He began with the injection of 0.001 m.g. T. R. On the following day, a fresh retinal hæmorrhage above the macula gave positive evidence of a local reaction in the eye. These injections were kept up for 15 months under the direction of Dr. Baumgarten. In addition, general tonic and hygienic measures were urged upon the patient with the result that the process in the fundus was entirely checked. Visual acuity in the right eye was restored to 16/30+. Tuberculin injections no longer produced any local

Fig. 1.—Photograph taken from colored drawing of fundus oculi, O.D., made by Dr. F. O. Schwartz.

ocular reaction. The ophthalmoscopic picture showed a perfect scar without any evidence of a remaining focus from which an active process could originate. When last seen in December, 1911—more than 2½ years after the treatment with tuberculjn was begun and nearly 4 years after the trouble in the right eye began—and a year and half after the tuberculin treatments had been stopped, the ocular condition still showed perfect retino-choroidal scars. (See drawings by Dr. F. O. Schwartz.)

The patient was complaining of having taken a "cold on his chest" in traveling at this time, but Dr. Baumgarten found the chest normal and the injection of 1/500 m.g. T. R. gave no reaction, general or local. His condition has remained good. He

has not deemed it necessary to return since but has reported by letter. By every test this case may be looked upon as cured.

The clinical course of this case seems fully to justify the conclusion, that the ocular condition developed as the result of an infection first located in the mucous lining of the postethmoidal and sphenoidal sinuses and that the pathogenic organism was the tubercle bacillus, though its presence was neither suspected nor searched for at the acute stage when it might have been demonstrated. Under the first tuberculin test injections and subsequent intranasal treatments, the condition in the sinuses was cured. At the same time the process in the choroid was merely inhibited. Under diminished resistance from strenuous living

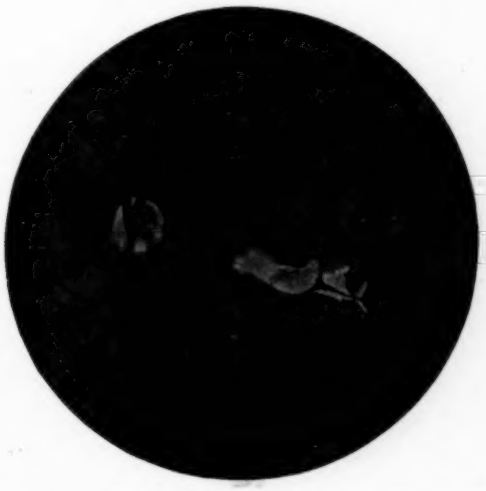

Fig. 2.—Photograph taken from drawing of fundus oculi, O.S., made by Dr. F. O. Schwartz.

and too much use of the eyes, together with what we may in retrospect easily recognize as improper pushing of antiluetic treatment, the ocular inflammation began to spread, until it was finally checked and cured by a course of tuberculin injections and general hygiene. The advantage of treatment in these cases seems apparent by comparing the conditions in the two eyes. It seems entirely likely that the process in the left eye twenty years ago was in every way similar to the more recent one in the right eye. In the latter vision=16/30 was retained while in the former it is only 16/120+. The suggestion that the bony wall of the canalis opticus may be symmetrically defective on both sides and thus lead to a similar location of the lesion in each eye is, of

course, purely speculative. Thus the infection could be passed from the nasal sinus on each side along the same track. This seems just as reasonable as that the infection should come from the general circulation and strike a symmetrical position in each eye.

It may be debated whether this process originates in the retina or choroid. The amount of retinal œdema, infiltration, and hæmorrhage shows the early involvement of retinal tissues. Yet this would probably be true of the overlying retina, if the process really began in the choroid. The resulting scar shows marked choroidal atrophy, while the retinal vessels pass over the spot without deviation. Of course, the retinal visual elements are destroyed by a violent inflammation of this type.

Other cases of choroidal tuberculosis under our care showed complications in the nose or throat, but as they had marked pulmonary lesions as well, further reference shall be omitted.

Case 2.—Central Retino-choroiditis.

H. B. A., age 17, white, male. Sight in O.S. gradually growing worse for 6 weeks; presented himself for examination at the Eye Clinic O'Fallon Dispensary of Washington University Medical School.

1912.—Ophthalmoscope showed O.D. normal, O.S. extensive retinal swelling (=about 4 D.) in the macula extending to the disc, with whitish exudate and small superficial hæmorrhages.

Tonometric tests showed 13 mm. O.D., 6 to 10 mm. O.S.

Neurological examination and general physical examination, especially of the chest and circulation, including careful urinalysis, at the Washington University Hospital failed to reveal any diseased state. The von Pirquet test was negative. Nasal examination showed the left middle meatus closed by swollen turbinates. The removal of a portion of the middle turbinate was advised to secure drainage. When it was accomplished, the mucous membrane in the region of the sphenoidal and posteth-moidal sinuses was seen to be congested, but no purulent secretion was found. The case was out of our observation until September 30, 1912 (about 3 weeks), when he presented himself at the office for private treatment. The œdema of the retina was now much less O.S., permitting a distinct view of the disc and larger vessels. In the macular region was a pigmented scar slightly more than a disc diameter in length and about half as wide, the retinal details were still somewhat blurred.

O.D. (normal) vision 20/10, O.S. vision 20/150.

Advised further nasal examination by Dr. Sluder and a hypodermic test with "Alt" tuberculin.

Dr. Greenfield Sluder found secretion coming from the sphenoidal sinuses—both right and left. An attempt to gather enough of this secretion to make a test injection into guinea pigs was a failure. Smears failed to reveal any bacteria.

October 18.—The injection of O.T. 0.002 m.g. gave no reaction locally in the eye or nose, or generally. The retinal condition, however, improved perceptibly and vision was raised from 20/150 to 20/60+ in O.S. The second injection of 0.002 m.g. O.T. two weeks later showed no reaction. Five days later 0.005 m.g. O.T. was injected and on the following day an unmistakable increase of retino-choroidal swelling was noted in the left eye. On the same day, a note from Dr. Sluder reported "more secretion in the postethmoidal and sphenoidal region today than usual". As Dr. Sluder had this case under daily observation for over a month, his finding has much significance. Even the last injection of 0.005 m.m. O.T. was not followed by a general rise of temperature. The reaction in the fundus of O.S. began to subside in 3 or 4 days. The patient was forced to leave St. Louis at this time.

When seen six months later (April, 1913) the pigmented scar in the macula was well defined, O.D. (normal) V. 16/12; O.S. V. 16/48.

He was not seen again for 15 months (July, 1914,) when he complained of asthenopic symptoms in O.D. which, on examination, proved to be due to a slight error of refraction. The macular scar, O.S., is unchanged. O.D. V. 16/8; O.S. V. 16/60+.

In its present condition, the case was demonstrated with the large Gullstrand ophthalmoscope at the meeting of the Ophthalmic Section of the St. Louis Medical Society, October 7, 1914.

In the binocular examination of the fundus O.S. made possible by this instrument, one finds faint concentric lines or folds in the retinal surface, probably the result of the very great retinal œdema at the beginning of the trouble and the subsequent contraction.

The absence of all physical disease elsewhere, the negative von Pirquet at the beginning, and the absence of a general febrile reaction after the injection of 0.005 m.g. of O.T., four months later, all point to the absence of a general tubercular infection.

On the other hand, the distinct local reaction in the nasal passages and the affected eye, as well as the prompt improvement

which followed the use of the tuberculin in doses too small to produce a reaction are practically conclusive evidence that the local process was the result of tubercular infection.

Not only to the posterior segment of the globe may tubercular infection be conveyed from the nasal sinuses. In the following cases the anterior ocular tissues, which are likewise reached by branches of the ophthalmic artery, and therefore are supplied by its perivascular lymphatics, seem to show the same relation.

CASE 3.—Parenchymatous Keratitis O.D.

F. O. B., age 13, white, male. Nashville, Ill. Seen first December 13, 1912.

O. D. inflamed for 2 months following a "bad cold". A circumscribed circular interstitial infiltration occupies upper tem-

Fig. 3.—Showing dense corneal infiltration on O.D. Note photophobia caused by holding upper lid open.

poral quadrant of the cornea O.D. showing as a dense white spot (see Fig. 3), and reducing vision to 16/96 O.D.; O.S. no disturbance at all, vision 16/12. The corneal epithelium was swollen over the infiltrated area, but never ulcerated.

Nasal examination by Dr. Simon showed atrophic retinitis with extensive crust formation masking any local reaction from the use of tuberculin. Prompt and regular treatment greatly improved the nasal condition. General condition good. No evidence of pulmonary tuberculosis. Sent to the hospital, and the temperature closely watched for 5 days. Then injected tuberculin O.T. 0.002 m.g. (R. arm). A slight reaction in the affected eye was noticed the following day, but was most marked on the second day. There was no rise of temperature nor general reaction. Ten days later a course of treatment with tuberculin was begun

by the injection of 0.001 m.g. tuberculin R. repeated at intervals for four months. No other treatment was used, except holocain solution 1 per cent., and atropin and cocain in oil locally to control symptoms, and general hygienic measures. The case went on to recovery without complications. When last seen (March 14, or fifteen months after the beginning of treatment), vision, with correction, was 16/19+ O.D., and 16/10 O.S.

The corneal infiltration had disappeared leaving a faint circular nebulosity to be made out by focal illumination. Casual examination showed no signs of the inflammation which had existed in the right eye. The left eye remained normal throughout. The patient reports by letter (October, 1914) that he has worked on the farm all summer in Nebraska without the slightest disturbance.

Case 4.—Chronic Uveitis.

Mrs. M., white, aged 36, residing in Arkansas, was first seen in August, 1913. She has worn glasses for 13 years. When the present glasses were ordered, 3 years ago, she was told a cataract was coming on in O.D. Cloudy vision seemed to make the eye "weak", O.D. V. 2/75, O.S. V. 16/30+.

Ophthalmoscopic examination revealed diffuse lenticular opacities in O.D., also diffuse pigment deposits on the anterior capsule of the lens, and a few deposits on Descemet's membrane. It was evidently a slow chronic inflammation of the ciliary body and iris which was probably responsible for the onset of lens changes in this eye. The other eye was entirely normal. Personal and family history good so far as general health was concerned. No evidence of lues or tuberculosis, though later the patient acknowledged exposure to T. B. while occasionally looking after a neighber who had recently died of pulmonary tuberculosis. Under euphthalmin solution, 1 per cent,, the pupil in the affected eye dilated fully and a faint red fundus reflex was made out. No evidence of scars or patches of exudate could be located in the fundus. A nasal examination was made by Dr. F. C. Simon, and Wassermann and von Pirquet tests were ordered. The Wassermann test proved to be negative. The von Pirquet test was positive, and was accompanied by a local reaction in the eye as shown by an increase of the deposits on Descemet's membrane. The first nasal examination showed nothing definite, but the patient was kept under observation. Three days later Dr. Simon reported some secretion coming from the right postethmoidal sinus. After waiting 3 days more, an injection of tuberculin R. 0.001 m.g. was made in the right arm. On the following day there was a marked

ocular reaction, increased deposits on Descemet's membrane, moderate hyperæmia, and pronounced photophobia. Dr. Simon reported a marked reaction had occurred in the nose, which began to subside on the second day as did the ocular reaction. The patient now was compelled to return temporarily to her home in Arkansas. On her return one month later, the late Dr. M. H. Post saw the case in consultation and concurred in the advisability of a course of treatment by injections of tuberculin. These have been continued at intervals during the last year. For the last six months, they have been made by her family physician. Though there had been improvement, no report on the present condition of this case can be made, but she is expected to return for examination shortly. Of course, we do not expect to clear the lens of its opacities by bringing the chronic tubercular uveitis under control and eventually curing it. The integrity of the eye demands that every effort be made to stop this process. The restoration of the nasal tissues to normal, as in cases one and two, has taken place more rapidly than of those of the eye. The general condition of the patient has been excellent throughout. No elevation of temperature was present at any time following the injection of tuberculin, nor was there any other sign which might be interpreted as a sign of general tubercudar disease.

To diagnosticate ocular tuberculosis, we must have the local reaction in the eye following the injection of tuberculin into the general circulation. Such a reaction was present in each of these cases. Furthermore, all but one showed typical nasal reactions at the same time. In that one case the nasal reaction could easily be masked by the crust formation in atrophic rhinitis, unless reaction harmful by its violence had been produced by the injection of too great a quantity of the tuberculin. These severe reactions are to be avoided, the more so in ocular tuberculosis, as they may result in increased permanent damage to sight. In all of these cases there was no evidence of pulmonary or any other form of general tubercular disease, therefore they may be grouped together. Another and larger group could be made of those in which the processes in the eye, nose, and throat, though in close relation to each other, were complicated by the presence of larger foci in the lung and elsewhere. It is sufficient for the present purpose to have emphasized the importance of the relation of conditions in the nose and throat to ocular tuberculosis. The therapeutic measures will have to be worked out specially for each case.

TRANSLATIONS.

THE STAINING OF THE ENDOTHELIUM OF DESCEMET'S MEMBRANE.[1]

SOME REMARKS CONCERNING HAMBURGER'S[2] WORK.

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(Translated by A. Alt, M.D.)

At the last meeting of the Ophthalmological Society of Heidelberg, in connection with von Szily's paper, Hamburger showed a specimen in which in his opinion he had succeeded in producing *intra vitam* an elective staining of the endothelium of Descemet's membrane by injecting intravenously a solution of sodium indigo-sulphate. From this he deduced important conclusions as to the physiology of nutrition of the eye and to the part played by Descemet's membrane in the absorption of the aqueous humor. At the very first occasion I stated[3] that in my experiments on such vital staining with lithioncarmin, trypanblue, pyrrholblue and isaminblue nothing of the kind was seen. The endothelium of Descemet's membrane remained always perfectly unstained. In his paper, "Contributions to the Nutrition of the Eye," Hamburger[4] again spoke on this subject, although Schreiber,[5] also, stated that his experiments, too, had proven negative.

Hamburger showed a picture in which a blue stain is visible. The experiment was made this way: 1.5 g. of a 2 per cent. solution were injected into the ear vein. A quarter of an hour later the enucleation was made. Aside from the staining of Descemet's membrane not a trace of color was found elsewhere in the eye. In the September, 1913, number of the *Klin. Mtsbl. f. Augenhlk.*, Hamburger maintains his statements. Yet in none of his communications do we find a description whether the staining was diffuse or granular. In judging such important questions this condition must be carefully observed, as we shall prove later on. It is well known, for instance, that living cells only can retain carmin in a granular state; dead cells lack this property. Fischel,[6] also, upholds the importance of this granular stain. Concerning the staining of the nucleus, he states that it never takes up the stain unless the cell be dead.

Schnaudigel,[7] too, has experimented with vital staining. He used in the main trypanblue, an acid stain. His results agree with mine. Besides a diffuse staining which may occur everywhere, he, too, could not, under normal conditions, find a characteristic granular stain in the cornea. Aside from the normally present pyrrhol cells, the iris showed not a trace of vital staining; but the protoplasma of the epithelia of the corpus ciliare was always well colored. Schnaudigel says: "Thus we have a fact which supports the assumption of transmission of the colored fluid taken up by the circulation especially, if not alone, through the ciliary body." From this behavior of the vital staining he is inclined to compare the epithelial cells of the ciliary body with those of the plexus chorioideus and of the tubuli contorti, which, too, give a vital staining; that is, we must assume, in the sense of Ehrlich, a biochemical modification or specificity.

Thus Schreiber, Schnaudigel and I have never found a vital staining of the epithelia of Descemet's membrane. We could expect this, although the aqueous humor is early colored, because, as is known, the endothelia of the bloodvessels do not take up any stain either, although the blood serum always assumes the color. There are only certain cells in the organism which have the faculty of storing up. The corpuscular elements in the blood are in general, also, unstained.

Hamburger gives three methods with which to demonstrate the vital staining of Descemet's membrane. Two (2 and 3) are intravenous injections of solutions of different quantities of staining material; the first one, however, is a local injection into the anterior chamber. These methods are so different that it is not permissible to treat their results as one. We speak, in general, of vital staining when the injection was made intravenously, subcutaneously or intra peritoneum, although Gurwitsch had results by feeding. With the local application various cells are stained which by no other method will assume a granular vital stain. I want to refer to Arnold's[8,9] papers only, who has shown that neutral red applied to the tongue of a frog can stain cells of different origin: epithelia, glandular cells, mastcells, leucocytes, ganglion cells, etc. When during such staining a granular color deposit takes place we can conclude only that the granula were preëxistent in the cells, and conclusions can only be permissible concerning the finer morphological constitution of the cells.

I have repeated my experiments with sodium indigo-sulphate.

I have produced a deep coloration by, for instance, injecting into rabbits 132 cc. of a 2 per cent. watery solution during 72 hours, partly intravenously, partly intra peritoneum. These animals showed macroscopically a deep blue coloration; Descemet's endothelia, however, as was *a priori* to be expected, showed no trace of granular vital staining, although the aqueous humor, also, was deep blue. But the typical staining (described by Schnaudigel and myself),[10] was present in the ciliary body.

I hope soon to give my results with vital staining in extenso; but, in order to avoid errors, I find it in place to say here something about the nature and the production of the vital granular staining.

Vital staining may be produced by basic or acid stains (Goldmann). It is important that the stains in the circulation should have passed through as few as possible chemical stages before the cells with a great affinity are reached (Fischel), and that the stains are used in solutions (as little concentrated as possible); otherwise clumpy deposits will result instead of fine round, sharply defined characteristic granules. Gurwitsch says that there can be no doubt that we have to deal solely with a storing up of dissolved staining material in granular formations or vacuoles within the cells, and that no undissolved particles of the stain enter the cells. When using methylenblue this is easily proven since it is blue in solution only and the smallest undissolved particles have a quite different purple color.

Schlecht[11] in his paper states: "We must insist that the cells of the animal organism in general act strongly elective towards the injected staining material. Under physiological conditions the same cells always retain or give off the staining material in the same manner. It seems that they take it up like a nutrient and that it is taken up by the plasmosoms of the cells." The carmin granula seem to represent cell granula laden with carmin (regularity in arrangement, equality in size of the granula, the substance found by Schmidt which holds the carmin granula, which can be seen in an ammoniacal fluid after the stain has been removed). According to Fischel the granula are identical with the living plasmatic elements in the cells; some phænomena suggest that the staining material enters into a chemical, if loose, combination, although Rumbler does not think this is absolutely necessary. Schmidt and Ribbert, too, declare that the carmin granula are the stained granula of the cells. Goldmann thinks we can exclude the possibility that these vital granula "are pro-

duced by damage to the protoplasm" and represent products of metabolism.

In general, there is only one kind of cells in the organism which has the faculty of retaining these staining materials in the circulation in granular form. Vital staining, then, means granula in these cells. These cell granula can be stained with chemically different stains. Heidenhain worked first with the indigo-sulphate of sodium which Hamburger employed and found that this stain is secreted, too, by the tubuli contorti. As regards the epithelia he states that when the quantity of injection fluid is large enough, the nuclei appear deep blue—an intravital nuclear staining.

Goldmann named the vitally stained cells, according to their tinctorial behavior, "pyrrhol cells." As stated in my paper, these had previously been seen and pictured by Ribbert.[12] As Schnaudigel also believes, they are identical with Ranvier's klasmatocyte, Maximow's resting wandering cell, Renaut's cellules rhagiocrines and Marchand's adventitia cells. These cells which have become sessile in the tissues are, according to Aschoff and Kiyono, histio- and endothelio-leucocytes, since these authors have proven that a large number of the mononuclears in the venous blood contain carmin granula. Aside from these the fat cells and the epithelia of the kidney and liver show a vital granular staining. Ribbert says: "Kidney and liver are the only organs the epithelia of which contain carmin. In all others in the salivary glands, mammæ, lung, pancreas, the adrenals I have never found carmin granules in the protoplasm of functionating cells."

Finally Gurwitsch's artifacts might prove of some importance in this question. The researches were made mostly in dead tissue hardened in alkohol. Gurwitsch worked with indigo and states that, although indigo is little soluble in absolute alkohol, the watery contents of the cells possibly are sufficient to dilute the alkohol so rapidly that traces of the stain are dissolved in it. Thus the possible post mortem diffusion of the stain can be excluded. The possibility of staining the nuclei, as reported by this author, is astonishing, since in general in the vital staining they do not take on a stain. Indigo-sulphate of sodium is easily reduced; therefore he preferred other stains.

From the foregoing no proof is furnished when the epithelia of Descemet's membrane are colored by the local employment of staining materials. Concerning the staining by intravenous and intraperitoneal injection, I can affirm that I am unable to agree

with Hamburger's statements, because I never succeeded with sodium indigo-sulphate (or with other stains mentioned in my paper) even with an intense and enormous retention of staining material to find a granular staining of the endothelia of Descemet's membrane.

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A CASE OF LATE INFECTION FOLLOWING ELLIOT'S OPERATION.

A. H. Griffith (*British Med. Jour.*, August 29, 1914) has done 125 trephine operations for primary glaucoma besides a good many for secondary glaucoma and for other diseases. He is well pleased with his results and thinks the operation much more satisfactory than iridectomy in chronic glaucoma. He was unfortunate, however, in having one case of late infection, producing a purulent iridocyclitis, occurring a little less than a year after operation. Griffith refers to the cases collected by L. Paul, who recorded the twenty-eighth case. These together, with one by J. Gray Clegg and Griffith's, make a total of thirty. Griffith admits that his confidence in the operation has been badly shaken and states that the risk of late infection must be considered as an inherent defect of Elliot's operation, and when infection took place it was through the conjunctiva covering the bleb and not through the edges of the conjunctival flap; he agreed with Marshall that it was the presence of the cystoid cicatrix that gave rise to an ever-present danger.

MEDICAL SOCIETIES

BERLIN OPHTHALMOLOGICAL SOCIETY.

Meeting of May 28th, 1914.*

1. *The action of experimental injections of thorium on the eye.* —G. Abelsdorff.

Our knowledge of the action of the rays of radioactive substances on the normal eye is based on experiments in which the rays enter the eye from in front. Thus the several parts of the eye are reached by the rays in a very unequal manner. In order to reduce this inequality and to get a better insight in the way the rays act, the author has introduced the active substance into the eye in the shape of thorium X-solution.

In rabbits the injection of thorium X-solution into the anterior chamber causes loss of color in the iris which with proper doses may even become totally atrophic. With larger doses parenchymatous keratitis, corneal ulceration and a severe conjunctivitis are added thereto.

When the injection is made into the vitreous body severe alterations take place in the retinal bloodvessels, hæmorrhages and exudations occur and end with the picture of a former chorioretinitis with partial atrophy of the optic nerve. In these cases the iris also loses its color. The lens remains transparent.

All of these alterations due to primary or secondary bloodvessel changes with thrombus formation are exclusively due to the rays contained in the thorium X-solution. The varying selective sensitiveness to the rays of the different tissues is very plain. While the lens remains transparent the chromataphores of the iris react on the smallest dosis with degeneration.

The frequently discussed question whether thorium causes, besides a central influence on the circulation, also a direct damage to the bloodvessel walls, has thus been decided in the latter direction by the ophthalmoscope and anatomical examination. (Demonstration of living animals and anatomical specimens.)

*Centrabl. f. prackt. Augenhlk., July, 1914.

2. *The microscopical measurement of the amount of sodium chloride and albumen in the aqueous humor and the nature of the increase of intraocular tension after subconjunctival irritation by sodium chloride.*—Roemer.

The author gives a concluding review of the experiments made together by Kochmann and Roemer on the pathological changes in the circulation of fluids of the eye. Attention is drawn to the fact that the hypotonus following in rabbits the intravenous injection of coma-serum can be explained by an altered distribution of the blood.

The changes of the intraocular pressure are solely dependent on the laws of arterial blood distribution. The often urged parallelism between the tension of the eye and the blood forms only one of nine possibilities.

The hypertonus which appears after subconjunctival sodium chlorid irritation is not due to a reflex, but the sodium chloride enters the anterior chamber and causes an osmotic or chemical damage to the bloodvessels in the interior of the eye, as proven by Ivan Bangs' michrochemical researches.

The maximum of albumen in the anterior chamber after sodium chloride injection does not coincide with the apex of the increase in intraocular pressure.

For the first time it has been proven that the increase in intraocular pressure after subconjunctival sodium chloride irritation can be prevented by therapeutic measures in the general circulation.

Meeting of June 25th, 1914.

1. West: On the experiences made during two years with the endonasal opening of the lacrimal sac in dakryostenosis.

2. Schwartzkopff reports on the results gained with optochin. hydrochlor. (æthyl-hydrocuprein) in ulcus serpens (experiments made at the Berlin University Clinic).

The action of former therapeutic measures was often unsatisfactory on account of resistance and variability of the following factors: (1) the virulence of the bacteria; (2) the resistance of the organism, especially of the cornea; (3) the lateness of the patients in seeking help.

Only through chemotherapy and the affinity of optochin for the pneumococcus proven by Morgenroth a basis was found for

a promising treatment of ulcus serpens. The author has used optochin since August, 1913, with satisfaction. In summing up the results only such cases were counted in which the pneumococcus had been found, in all 27 cases. At first a 1 per cent. watery solution was applied every hour; later on exclusively a 2 per cent. ointment recommended by Goldschmidt of the following composition:

Optochin. hydrochlor.	0.1
Atrop. sulf.	0.1
Amyl.	2.0
Vasel. flav.	10.0

It was found that the effect of the solution diminished after about 2 weeks while this was not observed with the ointment.

The first application of the remedy causes pretty severe burning which may be prevented by cocain. Afterwards this is unnecessary since optochin causes sufficient anæsthesia. To use optochin longer than 4 days is improper and unnecessary, since in most cases a retrogression of the ulcer is reached in that time. When this did not occur the cases were such very severe and neglected ones that optochin could no longer help. The after-treatment consisted of yellow ointment or noviform ointment.

In dakryocystitis the results were better when the removal of the sac was not done and the cleansing of the ulcer was awaited, than with an immediate extirpation, because thus the bandaging of the eye was avoided and an "open treatment" could be pursued in the first few days. The trial in two cases of influencing the dakryocystitis by this remedy was unsuccessful.

The average age of the ulcers before treatment was 15 days. Vision when the patients were discharged was 1/2 to 1 in 18 per cent. of the cases; in 30 per cent. of the cases 1/4 to 1. 37 per cent. of the cases, with a vision of fingers at 3 to 1 m. distance, there were other complications, as incipient cataract or fundus changes, etc.; 22 per cent. healed with vision of movements and light perception. All of these were very severe and neglected cases which were given such a bad prognosis when entering. Two eyes had to be enucleated, but these were not serpiginous ulcers, but typical ring abscesses; in one case there was a perforating injury.

3. Von Hasselberg showed a patient on whom Froelich had performed a cornea transplantation on June 13, 1913, with very favorable result. The patient had from infancy suffered from frequently recurring keratitis and had lately become totally blind,

so that she could not move around alone. There was considerable degeneration and calcification of the cornea. The occasion presented itself to get a transparent piece of cornea from a patient 22 years old, in whom an eye had to be removed on account of phthisis dolorosa. The two patients were lying on operating tables side by side. First a piece of opaque cornea was removed exactly from the middle of the cornea of the one patient with a von Hippel trephine (5 mm.); Descemet's membrane was left behind. Then such a piece ½ mm. in thickness was trephined from the cornea of the other patient, leaving Descemet's membrane intact. This piece was at once transferred to the other cornea. The little flap was held in place by two vertical parallel threads which were placed in the conjunctiva 3 mm. from the limbus, similar to the strings of an instrument. When on the third day the bandage was removed the conjunctival sac was full of mucus yet the flap was attached. A few days later it was slightly opaque and then cleared up again. Now there is a deeply black circle in the cornea which is transparent. Vision is now 1/60, fingers are counted in 3 m. Nieden 13 (Schweiger 1.1) is read at about 5 cm. The patient can now go about alone in Berlin and takes charge of her household. This is the fourth successful case; in many respects probably the most successful. The others are, the one of Ziehm (Olmuetz), success 7 months later; the one of Schimanowsky (Kiew), with V=1/8, which patient had possessed before the operation; and the one of Plange (Muenster), a lasting success; patient shown in 1907 and last in 1912. The cornea of animals should not be employed; the flap should be transplanted immediately and not first be conserved even for a few minutes. Descemet's membrane must not be transplanted, otherwise the flap becomes opaque. Fixation with sutures is unnecessary, the method used in this case is better than the one of Ziem who applied crossed threads. Corneal sutures do not answer the purpose, they endanger the nutrition. This success certainly stimulates us to further attempts. In Berlin it should be possible by collegial cooperation to get always sound, fresh cornea for such cases. Certainly there are many cases in blind institutes which might be helped.

TRANSACTIONS PHILADELPHIA POLYCLINIC SOCIETY.

April 9, 1914.

Report of Serious Ocular Conditions Due to Dental Diseases.—Dr. William Campbell Posey.

Dr. Posey reported two cases of ocular trouble in which the causal agent had apparently been an affection of the teeth. The first case, one of monocular retrobulbar neuritis, occurred in a young woman 25 years of age who had recently had the roots of the left lateral and central incisors crowned to repair the deformity occasioned by breaking off the bodies of the teeth in consequence of an accident. The nerves of the affected teeth had been carefully removed and the roots filled antiseptically. The ocular symptoms had appeared after an automobile ride in a sharp wind and were thought by Dr. Posey to have been occasioned by a retrobulbar involvement of the nerve in consequence of a periosteal inflammation emanating from the affected teeth. Other possible causal conditions were absent. Vision was reduced to counting fingers at 1 meter eccentrically, the reduction being due to a large absolute central scotoma. The temporal half of the disc was somewhat pale and the retinal veins were full. There was no neuritis. The fellow eye was normal. Rapid restoration of vision followed pilocarpin sweats, salicylate of soda internally and a blister applied to the temple of the affected side. Some dental applications were also made to the gums about the affected teeth. The patient passed from under observation at the end of a month, vision having been restored to normal and all symptoms having subsided.

The second case occurred also in a young woman, and consisted of a detachment of the retina in the left eye, which was apparently due to a long standing abscess at the root of an upper incisor upon the same side. The removal of the tooth caused the prompt disappearance of the sac, which had been palpable at the root of the tooth for several years previously, but brought no relief to the ocular condition, nor indeed did tapping the retina or prolonged rest in bed and the usual remedies ameliorate the ocular condition, the detachment still persisting as before.

Dr. Posey referred to the many ocular disorders contained in the literature apparently due to dental affections, at times in consequence of irritation of the terminal filaments of the 5th nerve,

but often purely neurotic manifestitations entirely coincidental and without the relation of cause and effect. Bruner's recent paper upon the relation of the teeth to the eyes was referred to at length and attention called to Lang's observation that in 215 cases of ocular disease observed by him which could be attributed to sepsis, pyorrhœa was the sublying cause in 139 instances.

DISCUSSION.

Dr. Leighton F. Appleman reported a case that he had had under observation for the last three weeks of a man who suffered a rather sudden reduction in sight in the right eye, and who showed haziness of the retina, with dilatation of, exudation and hæmorrhage along the lower temporal vein which later involved the superior vessels as well, with hæmorrhages in the retina, giving a picture of thrombosis. No history of lues or other constitutional disease could be elicited.

He was placed in the hospital and given sweats, with inunctions of mercury daily. Improvement seemed rather tardy. It developed later that he had been struck on the upper central incisors with a ball about five months previously, and that an abscess formed at the root of the left incisor, for which he had received treatment a short time after the injury. Wishing to know whether there was still any trouble at this site, he was referred to a dentist, who found an abscess at the root of the right incisor, which he drained and treated.

Following this, improvement in the condition of his eye-ground seemed to improve more rapidly, and it seemed fair to assume that the dental abscess was the cause of this ocular condition.

Dr. Wendell Reber referred to three cases of serious ocular conditions due to dental diseases, all three of which were proven to be of dental origin. They were reported in *Dental Brief,* for June, 1904.

Spontaneous Absorption of the Crystalline Lens.—Dr. William Zentmayer.

The group of cases of spontaneous absorption of the crystalline lens here related is of interest as it contains cases representative of the different conditions which may give rise to the antecedent dislocation of the lens. In all four instances the absorption occurred without the production of secondary glaucoma or an irritative iridocyclitis, and in all but one useful vision was restored.

Spontaneous absorption of the lens rarely occurs with the lens in its normal position, or without a rent occurring in its capsule. Dislocation of the lens either into the anterior chamber or into the vitreous usually first occurs, and such dislocation follows a weakening of the suspensory ligament of the lens through disease of the vitreous secondary to a choroiditis or cyclitis, progressive myopia or distension of the globe in hydrophthalmos. Atypical development of the zonule is the cause of congenital dislocation of the lens. Blows upon the eye often dislocate the lens which may later undergo absorption, but such cases are not "spontaneous".

The cases here reported illustrate rupture of the capsule from congenital anomalies, weakening of the zonule from congenital glaucoma, and during the development of hypermature cataract. In the last variety there is often a contributing cause in an associated choroiditis and jarring of the body in coughing or jumping, or perhaps a blow upon the eye so slight that it went unnoticed by the patient. At this time I shall not give details of the cases but mention only the important points in the history bearing upon the subject under discussion.

The first case was one of unusual interest aside from the condition under consideration. In April, 1894, a child 21 months old was brought to my office because of a cast in its eye and of the so-called amaurotic cat's eye appearance. The right eye was turned slightly up and strongly in, the pupil was semi-dilated. T.N. At the posterior pole of the lens there was an oval greenish reflecting opacity. This occupied but part of the pupillary area and through the clear periphery of the lens a prologation backwards of a cord of white tissue could be made out. In the middle of this there was a red streak, probably the hyaloid artery still blood bearing.

Two and one-half years later there had been no change other than the development of a stronger degree of convergent squint. Five years from the time of the first visit he returned with laminated opacities in the posterior layers of the lens which later became a total cataract. Four years from this date he returned with absorption of the lenticular substance and a thickened capsule with a large rent in the anterior capsule. Through this there could be seen attached to the capsule remnants by a base of about 2 mm. a freely moving hyaloid sheath, constricted for a short distance, then flaring out as it approached the disc so as to hide all but its upper inner segment. As the membrane ap-

proached the lens it was seen to bifurcate, one band going to the posterior capsule, the other turned nasalward and traceable to the region of the ora serrata. There was an area of choroidal atrophy, possibly an incomplete coloboma at the lower border of the disc. H=9 D. V=L.P. The other eye showed no anomalies.

The development of cataract in this case may have been due to the traction of the hyaloid structure upon the capsule of the lens and the subsequent absorption may have been due to rupture of the capsule from the same cause.

The second case was one which because of other features was remarkable. A man 47 years of age had a high degree of hydrophthalmos in the right eye. The left eye had been recently removed for absolute glaucoma. Twelve years before he had been told that he had a cataract in the right eye. Vision became reduced to light perception. Some years later vision was suddenly, in part, restored to it. The eye presents all the features of congenital glaucoma with aphakia. While the haze of the cornea prevents an accurate view of the interior of the eye, still not even a trace of the lens could be found. Vision with +13 D.= 20/30 pt.T.—90 mm. An Elliot operation was performed reducing the tension to 10 mm. one month after the operation.

The third case was that of a compositor who came for the treatment of a severe iritis in the O.D. He said that he had lost the vision of the left eye from cataract many years before and had been advised to have the cataract removed but that he never had had the operation performed. He believes, however, that the sight has improved somewhat. Examination showed an aphakic eye with no trace of the lens. Vision with +11 D. 16/10. The right eye was almost blind from a plastic iritis.

The fourth case was one in which Dr. Zentmayer had performed a successful cataract extraction upon the right eye some years ago. The fellow eye at that time showed a cataract somewhat hypermature. Two years later the patient returned stating that the eye operated upon had gradually gone blind, but that the unoperated eye had much improved. In the operated eye there was a complete glaucoma and in the left the lens had disappeared, but there were a great many coarse opacities well forward in the vitreous. With the proper lens visual acuity was almost normal.

DISCUSSION.

Dr. Posey said that the remarkable restoration of sight in those formerly blind could usually be accounted for by the

cataractous lens slipping from its position in the pupillary axis into the vitreus. While, as Dr. Zentmayer had pointed out, the lens in such cases becomes absorbed, it more often happened that this did not occur, but that the lens mass remained and gave rise to irritation of the ciliary body. If absorption of the lens could be relied upon, the desirability of removal of dislocated cataractous lenses would not so often come into question.

W. WALTER WATSON, M.D., Sec'y.

ABSTRACTS FROM MEDICAL LITERATURE.

BY W. F. HARDY, M.D.,

ST. LOUIS, MO.

BLEPHAROPLASTY BY A PRE-GRAFTED FLAP.

Charles Gibson (*Annals of Surgery*, June, 1914) describes a method of blepharoplasty which in several cases has yielded results superior to and more satisfactory than the heretofore accepted methods. An eyelid to be proper is smooth and lined with an epithelial layer and is free from the eyeball. It occurred to Gibson that any transplanted flap which was to replace a gap in the eyelid should have an epithelial lining. First of all, the flap is outlined and prepared by grafting its inner surface and the lesion (epithelioma) is removed and the flap transplanted into the resulting cavity only when the flap shall have been demonstrated to be properly prepared to take the place of the eyelid. A two-step operation is necessary. The first step consists in making an incision through the whole thickness of the skin, starting at the external canthus and running somewhat obliquely upward for a suitable distance, according to the size of the flap required. By dissecting down through the preliminary incision a pouch is made corresponding to the size of the eventual flap and into this the skin graft can be tucked just as one places a handkerchief in the pocket. A single skin graft of suitable proportions is cut and is introduced into the pouch. This graft is a little larger in its vertical diameter than is necessary, allowing the top portion to be turned over on the raw edge of the flap. A protective dressing is applied and the graft is allowed to heal in

place and the transplantation is not made until the healing is an accomplished fact and no raw surface exists. As a rule, this requires about 10 days. The second step is the excision of the epithelioma by a quadrangular incision, the pre-grafted flap is freed and is slid into the gap left by the excision of the epithelioma. The flap is sutured in place. Healing takes place in less than a week. The after results are satisfactory. One great advantage claimed is the presence of a free palpebral margin lined with a satisfactory substitute for mucous membrane, which it comes to closely resemble. The preliminary operation allows for the normal shrinking of the flap and in the second operation it is only necessary to cut the flap the exact size necessary to fill the gap. In the cases reported, ten years in one and in the other seven years have elapsed since the operations, and in that time the flaps have not shrunk or altered in any way. Eight cuts accompany the original article showing method of making the flap and also the after results. These cuts make the text regarding the technique readily understood.

TRAUMATIC EXFOLIATIVE KERATITIS.

P. A. Harry (*Lancet,* June 13, 1914) contributes an article on this subject. It is a compartively rare condition, met with chiefly in adult males and characterized by severe neuralgic pains, lacrimation, photophobia and a tendency to periodic relapses. A history of traumatism is invariably present. The injury may be trifling. Harry in one year had six cases come under his observation. In this series the trauma was produced by a child's fingernail, the sharp end of a piece of straw, the edge of a ladies' hat pin, the point of a dried leaf and a crust of bread. All the patients were thin, poorly nourished and neurotic, or arthritic in type. The symptoms are pain simultaneous with the opening of the eyes in the morning, like a sharp stab or as if a needle had been pushed through the eye. Attempts to separate the lids cause a repetition of the pain. Relief is only obtained when the patient buries his head in the pillow or makes firm pressure on the globe with the fingers. The eye is red and the vision slightly defective. With or without treatment the attack lessens and the eye returns apparently to normal in a few days. In four to six weeks a recurrence takes place, without warning or indiscretion on the part of the patient. The subsequent attacks are never as severe as the first. In this condition the attachment of the epithelium to Bowman's

membrane is very loose; if the upper layer of the cornea is touched with a cotton tipped probe it slides from Bowman's membrane like a cloth off a well polished table. The epithelial layer crinkles or ruffles and comes away in patches, but there is no exfoliation. The separation takes place with the greatest ease in the immediate vicinity of the original abrasion, and the separation can be continued up to about 3 mm. from the limbus. Beyond this it is impossible to go and attempts produce bleeding. The diagnosis must be made from several corneal diseases and dystrophies. Herpes febrilis corneæ occurs in febrile diseases, viz.: influenza, pneumonia and measles, and is associated with an eruption of vesicles on the cornea. Herpes zoster corneæ is likewise associated with an eruption of vesicles. Keratitis vesiculosa or bullosa occurs in blind diseased eyes. The generally accepted theory of the ætiology of the condition is that the new epithelium formed after the abrasion is not firmly attached to the subjacent tissue and is easily detached. The inequalities of the corneal surface become interlocked with the corresponding inequalities of the corneal epithelium; when the eyes are opened after sleep the lids pull on the corneal epithelium raising it in the form of a blister and drags upon the nerve filaments, causing pain. Harry does not accept this or the other explanations given for the trouble, but thinks it more likely that a toxin manufactured at the site of the erosion, although unable to penetrate Bowman's membrane, can spread along its surface, producing exfoliation up to a certain point. The exfoliated layer examined under a microscope shows among other changes a granular degeneration of the intracellular spaces most marked near the seat of injury. At the center of this area the disintegration progresses to actual loss of substance. The abrasions of the cornea in Harry's cases were all tangential to the surface, and he thinks that under the flap thus formed organisms were introduced and the quickly healing epithelium left them embedded. The toxins they produce give rise to the exfoliation.

The treatment consists usually of bandaging, the introduction of neutral fatty substances and the instillation of cocaine or other drops. Relief is only temporary; more permanent relief is obtained by touching the eroded spot with a caustic, such as silver nitrate, carbolic acid, iodine or formalin. In Harry's cases the following line of treatment was carried out. Anæsthesia of the conjunctiva and douching of the conjunctival sac with

saline solution. Several oblique punctures with a Bowman's needle were made into the anterior chamber at and around the seat of trauma. Before withdrawing the needle it was turned at right angles to allow the antibody containing aqueous to escape slowly. This together with the use of weak peroxide of hydrogen lotion and 2 per cent. chloretone in parolene drops is sufficient to produce a cure and prevent relapses.

AN IMPROVEMENT IN LOCAL ANÆSTHESIA IN OPERATIONS UPON THE EYE.

G. H. Pooley (*Ophthalmoscope*, August, 1914) has in the past found difficulty in obtaining satisfactory local anæsthesia in cases of severe injury where general anæsthesia was undesirable. He finally had recourse to alypin used in one per cent. solution in normal saline combined with a little suprarenal extract. His object is to block pain impulses from the iris, cornea and ciliary body by injecting the solution deep enough and in sufficient quantity to anæsthetize the ciliary nerves at the posterior pole of the eye. The shortest route by which a needle can penetrate to this region is from the outer margin of the orbit. A straight needle is used and the eye turned to the side opposite the operated one. The conjunctiva is anæsthetized with cocaine. A hypodermic syringe with a graduated barrel, a stout steel needle specially sharpened and a sterilized solution of alypin are required. The conjunctiva is picked up with forceps at the outer side of the eyeball midway between the fornix and corneal margin, the needle pushed through conjunctiva and three or four minims injected, the point of the needle being directed towards the fornix. The needle is then withdrawn and the patient is made to look in the opposite direction to the eye which is being operated upon. The point of the needle is then brought in contact with the conjunctiva at the fornix just above or below the external rectus muscle and introduced with a short sharp stab through the conjunctiva and Tenon's capsule, a few minims of solution are injected and the point pushed on in the direction of the posterior pole and fifteen to sixty minims injected. The latter dose has not proved harmful. Complete anæsthesia is obtained. Pooley has used this method in sclerostomy, cataract, evisceration, iridectomy, removal of steel by magnet and division of synechiæ—a total of forty-seven cases. Post-operative vomiting occurred in one case of glaucoma, three of cataract

and in one case of evisceration. There was no obvious proptosis and no bad results in any other respect. Visual acuity has been satisfactory and there has been no retardation of healing, sepsis or toxic effects. Novocaine is mentioned as a possible anæsthetic in this method but was not tried. Squeezing of the lids is done away with which is of inestimable benefit. The formula used is as follows:

Alypin, gr. xv⅓; sod. chlor. gr. xii; sol. adren. (1:1000) m. x; aq. ad. ℥iii½.

THE TREATMENT OF THE EARLIER STAGES OF SENILE CATARACT.

Lieut. Col. Henry Smith contributed a short article on the above subject in *The Ophthalmoscope*, September, 1914. He divides the earlier stages into two: (1) The stage we can treat without operation, and (2) the stage in which operation is necessary. Patients with a vision of 6/8th, 6/9th or 6/10ths, and showing the early loss of transparency of the lens which often constitutes the beginning of cataract, are treated by Col. Smith with subconjunctival injections of solutions of cyanide of mercury. Twenty-five minims are injected of a 1-4000, 1-5000 or 1-6000 strength. Smith states that in many of the cases vision within a month comes up to 6/5 or 6/6ths. Cases with sand-like opacities and with a clear pupillary area respond equally well to these injections but are prone to rapidly relapse. In the second class of cases where definite opacities exist Smith thinks operation is necessary. He deprecates capsulotomy and ripening operations and designates Homer Smith's procedure as "the worst of the lot". The normal senile lens is as easily dislocated as the mature senile cataractous lens. Cases offering the greatest difficulty are those of slowly ripening senile cataract associated with disease of the choroid. Col. Smith takes issue with the statement that the eye of the white man is different from that of his Aryan brother. From his experience with many Europeans he finds no difference. The objection raised to the intracapsular operation, that it cannot be done without an iridectomy, is without a basis of fact. Smith states it is as easily done without an iridectomy as with one and that he has frequently done it through an opium-pupil without difficulty. The pupil after intracapsular operation is U-shaped, that after the capsulotomy operation is keyhole. The explanation is that after the

Indian operation the iris is free, whereas, the pillars of the coloboma following the capsulotomy operation are tied down to the after cataract; hence it is keyhole.

From the patient's point of view the second class demands urgent consideration on account of the depressing influence that delay involves, and the financial loss entailed. Col. Smith urges that something be done for this unfortunate class of people and feels that the intracapsular operation offers the best solution of the question.

SAFE AND SPEEDY EXTRACTION OF THE IMMATURE CATARACTOUS LENS FOLLOWING PRELIMINARY CAPSULOTOMY.

Homer Smith (*Jour. Am. Med. Assn.*, September 5, 1914) gives a review of his technique and results in the extraction of the immature cataractous lens following preliminary capsulotomy. The contentions embodied in his thesis are (1) An ample properly executed preliminary capsulotomy has, in mature cataracts, many advantages over immediate capsulotomy or capsulectomy. (2) In Morgagnian cataract it enables one to make what is difficult otherwise, namely, an efficient opening in the capsule. (3) The extraction of the clear lens in high myopia is feasible by this method; and (4) it will render immature cataract operable after a six-hour interval, leading up to a clean extraction. Smith holds that none of the accidents ordinarily occurring in the old methods of capsulotomy accompanies a preliminary capsulotomy as described in his paper for the following reasons: 1. The knife can be made superlatively sharp and efficiently cuts the capsule in both directions. 2. Only through the greatest carelessness can the suspensory ligament be ruptured or the lens dislocated, for this is held firmly in place by the vitreous behind and the aqueous in front. 3. Ample space is given through the dilated pupil, and the point of the knife may be kept fully in view during the division of the capsule, and furthermore, the operator has the satisfaction of knowing that this is adequately performed. 4. The iris cannot be wounded or entangled in the instrument, and there can be no bleeding to obscure the field of operation.

BOOK REVIEWS.

MANUAL OF THE DISEASES OF THE EYE FOR STUDENTS AND GENERAL PRACTITIONERS. By Ch. H. May. Eighth Edition, revised. With 377 original illustrations, including 22 plates, with 71 colored figures. New York, 1914: W. Wood & Co. Price $2.00.

This very handy and excellent textbook, of which the eighth edition has just been issued, hardly needs any further words of praise than it has previously received. It goes without saying that this edition has again been brought up to the most recent acquisitions of knowledge in the field of ophthalmology.

THE OPHTHALMIC YEAR BOOK, Vol. X. Containing a digest of the literature of ophthalmology for the year 1913. Edited by Edward Jackson, M.D., assisted by ten co-workers. Illustrated. Herrick Book and Stationery Company, Denver, Colorado, 1914.

Like the former volumes, this is a very complete digest of the ophthalmic literature of the previous year. This digest is preceded by biographic notices of the ophthalmologists who have died during this period.

It is hardly possible to praise Dr. Jackson's work sufficiently and to commend him for his courage and persistence in publishing the Year Book in spite of the unusual lack of appreciation by the large mass of ophthalmologists. While the publication of the Year Book is receiving some aid from the Knapp Memorial Fund of the Section on Ophthalmology of the American Medical Association, a general support by our confrères alone will place it on a safe and lasting basis. Surely Dr. Jackson and his co-workers should receive such a general support for their admirable work.

THE QUESTION OF ALCOHOL. By Edward Huntington Williams, M.D. New York: The Goodhue Company, 1914.

This little volume belonging to "The Personal Question Series," published by the Goodhue Company, gives the sane views of a scientific mind having studied the alcohol and other "dope" questions thoroughly. The author denounces the hysterical methods and false statements of the zealots and gives his own, we think, excellent ideas of how to remedy an evil which is recognized by all. The booklet is well worth reading for every student of sociology.

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